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The Effect of Three Quarters of Service Course Physical Education Upon the Physical Fitness of Male Freshmen at South Dakota State College

James Prins Jr.

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THE EFFECT OF THREE QUARTERS OF SERVICE COURSE
PHYSICAL EDUCATION UPON THE PHYSICAL FITNESS
OF MALE FRESHMEN AT SOUTH DAKOTA
STATE COLLEGE

By
James Prins, Jr.

A thesis submitted
in partial fulfillment of the requirements for the
degree Master of Science at South Dakota
State College of Agriculture
and Mechanic Arts

August, 1957

THE EFFECT OF THREE QUARTERS OF SERVICE COURSE
PHYSICAL EDUCATION UPON THE PHYSICAL FITNESS
OF MALE FRESHMEN AT SOUTH DAKOTA
STATE COLLEGE

This thesis is approved as a creditable, independent investigation by a candidate for the degree, Master of Science, and acceptable as meeting the thesis requirements for this degree; but without implying that the conclusions reached by the candidate are necessarily the conclusions of the major department.

U Thesis Adviser U

Head of the Major Department

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JP

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CHAPTER I

THE PROBLEM

Introduction

A physically fit person is said to possess "soundness of body, plus stamina, skill, and ability to do work under fatigue."¹

Another definition of physical fitness includes the following:

Fitness for living be it in the home, on the farm, in the factory, or at the front implies freedom from disease or significant deviations from normal structure and function; enough strength, speed, agility, endurance, and skill to accomplish the maximum tasks that the day may bring; and mental and emotional adjustment appropriate to the age of the individual. Physical fitness (really physical aspects of fitness) is only a part of total fitness. The limitations of fitness are determined and modified by inheritance but within these limitations daily living practices may develop and otherwise influence fitness.²

McCloy³ states that one must have an adequate amount of strength and endurance to be physically fit in the sense of the functioning of the neuromuscular systems. "Adequate" may

¹Eleanor Metheny, "Are Sports Enough," Journal of Health and Physical Education, XII, May, 1943, p. 254.

²Habel Lee and Miriam M. Wagner, Fundamentals of Body Mechanics and Conditioning, (1st edition; Philadelphia and London: W.B. Saunders Co., 1949), p. 4.

³C.H. McCloy, "What is Physical Fitness," Journal of Health, Physical Education, and Recreation, XXVII, September, 1956, pp. 14-15.

be defined differently for people whose demands are different. For example, what would be adequate for a football player would be more than adequate for a college professor.

The Joint Committee of the American Association of Health, Physical Education, and Recreation and the American Medical Association has defined physical fitness as "...enough strength, speed, agility, endurance, and skill to accomplish the maximum tasks that the day may bring."⁴

Karpovich and Schneider⁵ believe that despite differing meanings of physical fitness, all definitions agree that it denotes adaptability to some specified muscular stress. The term "physical fitness" has been used to mean physiological normalcy of the body and by implication to indicate the state of health of an individual.

Many authors have attempted to explain the value of exercise and its effect upon the body. Beyer⁶ reported observations on the growth of 188 naval cadets who took special systematic exercise and compared it with the usual growth of cadets of the same age. An increase of more than

⁴Robert McCollum and John Coefield, "A Case Study of 78 Freshmen with Low Physical Fitness Indices," (microcarded M.S. thesis, University of Oregon, 1955).

⁵Edward C. Schneider and Peter V. Karpovich, Physiology of Muscular Activity, (1st edition; Philadelphia and London: W.B. Saunders Co., 1948), p. 8.

⁶Jesse F. Williams, Healthful Living, (1st edition; New York: Macmillan Co., 1938), p. 173.

one inch in height was noted for those who took part in the special exercise. The increase in strength was five times as much as the normal increase of the control group. An increase was also noted in the lung capacity of the group that exercised. One can readily see why the effect of exercise upon the bodies of children is a major concern of parents.

To further stress the value of exercise, a study was made of all Harvard freshman male students. The subjects participated in exercise for 30 minutes, four times a week, for a period of six months. The following improvements were noted: one and three-fourth inches increase in the girth of the chest, one inch increase in the upper arm, one and one-half inches increase in the size of the thigh. Exercise also improves muscular coordination and control. Lack of coordination results in clumsiness in the performance of any act requiring dexterity.⁷

According to Smiley and Gould,

Vigorous exercise speeds up the circulation, favors lymphatic drainage, expands the lungs, flushes out the stagnant eddies of the air in the less accessible air vesicles, stimulates activities of the bowel, produces a watery perspiration, increases oxidation and excretion, and provides for a more rapid turnover of fluids in the body.⁸

Exercise is one of the essential requirements for good

⁷Dean Franklin Smiley and Adrian Gordon Gould, Your Health, (1st edition; New York: Macmillan Co., 1951), p. 278.

⁸Ibid., p. 279.

health. It not only improves the tone of the muscular system, but also imparts a stimulus to all the tissues and organs of the body.

According to Steinhaus,⁹ an individual's muscles become larger and therefore stronger as a result of exercise. Only exercise which is heavy enough to tax a muscle to its limit will stimulate muscles to grow larger and correspondingly stronger.

McCloy reports on the significance of muscular strength as follows:

Individuals who are 25 percent overweight, or individuals who have only four-fifths of the normal amount of muscle for given weights suffer certain hardships. The undermuscled individuals tire easily, and this fatigue is cumulative to complete exhaustion. The overweight individuals carry too great a load for the muscle structure of their bodies. Thus muscle efficiency is lessened, because the efficiency of the muscle contraction is related to the muscle load. A muscle with a light load operates more effectively than one that is overloaded. This overload also leads to fatigue, and constant fatigue becomes a health handicap, in that fatigued individuals are more liable to colds.¹⁰

Rogers adequately stated the opinion of physical educators and physiologists in one of his articles when he wrote the following concerning the necessity of strength in

⁹A.H. Steinhaus, "Why Exercise," Journal of Health and Physical Education, V, May, 1934, pp. 5-7.

¹⁰C.H. McCloy, "How About Some Muscle," Journal of Health and Physical Education, VII, May, 1936, pp. 302-303.

the human body:

The positive and very high relation of muscular strength to general health, physical fitness, or "capacity for activity" can hardly be questioned. With no strength there can be no physical activity; moreover, when muscular strength is low, all other life functions are handicapped. One can hardly see as much, hear as much, meet as many people, or contribute as much to social life when one is continually fatigued by the most necessary activities of life--eating, digestion, attention to environment, and the physical movements incident upon travel from one group of surroundings to another. The relation of the effective condition of voluntary muscle tissue to other organic conditions is just beginning to be recognized; but experiences are multiplied which reveal, beyond peradventure, the truth of the following rule: Practically every change in the condition or functioning of the vital organs has a corresponding change in the condition or functioning of voluntary muscle.¹¹

Statement of the Problem

In our age, one marked by an ever-increasing number of effort-saving devices, we should be concerned with new methods of muscular development needed for normal growth. These new methods are significant because they must replace the old means by which man automatically, in his everyday life, got the required resistive exercise needed for such normal growth and development.

In South Dakota, as in many other states, living is easier than it was 25 years ago. One can simply visit a

¹¹P.R. Rogers, "The Significance of Strength Tests in Revealing Physical Condition," Research Quarterly, V, October, 1934, pp. 43-46.

farm implement store and view all the gadgetry and machines designed to replace physical labor by man.

It is the inherent purpose of the public schools to prepare the child for both his present and future life. A good physical education program is one area in the school curriculum which must be provided to insure the child's total development. Yet, in a recent survey conducted by the author, it was found that nearly 50 per cent of the public schools in which incoming freshmen at South Dakota State College were trained required no physical education in their high school curriculum. One might immediately wonder how the children of our state will be exposed to the variety of activities found in the well-planned physical education program developed by teachers. As it is now, if a child does not attend college and if he did not have regular physical education in high school, he will never profit from this means of education.

It is also reported in the survey conducted by the author that the majority of the high school physical education teachers do not wear appropriate uniforms when teaching their physical education classes. If the teachers do not take the time to change into suitable attire for teaching, then one would suspect that there is very little advance preparation for the physical education classes. This fact is evident when a majority of the freshmen questioned stated that the physical education program was not educationally

progressive in difficulty with each succeeding year of work.

In addition, the students claimed that football, basketball, and volleyball are the main activities stressed in the high school physical education program, with much emphasis placed on varsity competition. It is evident that many teachers make no attempt to offer a well-rounded program, utilizing the many activities at their disposal.

It was with the results of this survey at hand that the author was motivated to do the following study, the purposes of which are:

1. To determine the physical fitness index of all incoming freshman men at South Dakota State College for the school year of 1956-57.
2. To compare the physical fitness index of the students from rural communities with that of those coming from urban communities.
3. To determine the physical fitness index of the students enrolled in the various divisions of the college.
4. To compare the physical fitness index of the students lacking physical education in high school with those who had completed a physical education program.
5. To determine the physical fitness index of the various age levels found among the freshman men.
6. To then compare the physical fitness index of these various groups as measured at the beginning of the school term with the index attained after a year of service course

physical education at South Dakota State College.

CHAPTER II

RELATED LITERATURE

About 1900 a search was begun for a test with greater functional value than the antropometric tests, which consist only of gross exterior body measurements. This need led to the development of strength tests which give a higher relationship to physical performance. Sargent and Martin¹² developed the first of these strength tests which consisted of ten items. This test was used to measure physical ability. Later, Rogers¹³ presented his tests of motor ability and tests of physical fitness which consisted of seven items. Additional studies have shown that strength is only one element of physical fitness. Its importance depends upon the type of physical performances to be made by an individual and the degree to which success in the performance is contingent upon muscular strength. The Rogers' strength test, known as the "Rogers' P.F.I." has norms, and is considered as one of the best measures of physical fitness used today.

McCollum and Coefield¹⁴ administered the Rogers'

¹²Leonard A. Larson and Rachel D. Yocom, Measurement and Evaluation in Physical, Health and Recreation Education, (1st edition; St. Louis: C.V. Mosby Co., 1951), p. 77.

¹³*Ibid.*, pp. 77-79.

¹⁴Robert McCollum and John Coefield, "A Case Study of 78 Freshmen with Low Physical Fitness Indices," (microcarded M.S. thesis, University of Oregon, 1955).

physical fitness index test to all male freshmen enrolled at the University of Oregon in 1954. All students who scored less than 85 on the Rogers' test were enrolled in a developmental physical education class for one term. These students were given a program which was geared to raise the physical fitness level of each student.

McCollum and Coefield concluded from this study that:

1. Considerable improvement was indicated in physical fitness, as measured by the Rogers' physical fitness test, after one term of developmental physical education; however, in some instances, one term was not sufficient for the weak individual to achieve normal fitness.
2. An apparent relationship was discovered between improvement in the physical fitness index and scholastic achievement.
3. Many of the persons whose scores were low on the Rogers' physical fitness test expressed a serious personal problem in adjusting to college life.
4. The students who initially had a low physical fitness index tended to be socially maladjusted.
5. Sixty-five per cent of those in the study group expressed dissatisfaction with their own physical condition. Many of these men felt that their high school physical education programs were not sufficient for the development of physical fitness.

There has always been much concern over the value of a regular program of physical education and athletics.

Schneider and Karpovich¹⁵ pointed out that physical educators

¹⁵Edward C. Schneider and Peter V. Karpovich, Physiology of Muscular Activity, (1st edition; Philadelphia and London: W.B. Saunders Co., 1948), p. 8.

are usually of the opinion that physical education and athletics prolong life. Morgan¹⁶ was the first to study the problem of mortality among athletes. He attempted to compare the life expectancy of men who rowed in the Oxford and Cambridge races between 1829 and 1859 with the life expectancy of the average Englishman. Morgan concluded that the life expectancy of the oarsmen exceeded that of the average Englishman by two years.

Anderson,¹⁷ in another study, concluded that the mortality among students who attended Yale University between 1855 and 1905 was lower for athletes than for non-athletes.

Hahn, Herzheimer, and Brose¹⁸ examined 50 elderly athletes who had participated in athletics in their youth and could not find any pathological changes which could be ascribed to vigorous athletic activities.

Our Armed Forces have always been concerned with the physical fitness status of their recruits. Using the American Air Force's physical fitness test achievement scales, Riedman¹⁹ reported that between one-half and two-thirds of the men examined for service were classified as being in poor

¹⁶Ibid., p. 9.

¹⁷W.G. Anderson, "Further Studies in Longevity of Yale Athletes," Mind and Body, XI, December, 1916, pp. 30-32.

¹⁸Schneider and Karpovich, op. cit., p. 259.

¹⁹Sarah R. Riedman, Physiology of Work and Play, (1st edition; New York: The Dryden Press, 1952), p. 560.

physical condition. The men examined were lacking in:

1. Running speed and endurance.
2. Endurance of abdominal muscles.
3. Arm and shoulder strength.

After a training period of five months, all scored consistently higher on all physical fitness tests.

From this large proportion of poor physical classifications, one might conclude that the American male has specific weaknesses in the development of the large muscles. The role of muscular activity as one of the bodily functions is seen when children play. Play is as much a part of their physical, emotional, intellectual, and social growth as are sleeping and eating.

Strenuous gross bodily movement is necessary for normal development. Light exercise does little to stimulate heart action, to raise the level of pulmonary ventilation, or to promote venous circulation. It is said that fast walking, sports, team games, and activities such as mountain climbing raise the level of metabolism to a point at which the circulatory and respiratory systems receive the stimulation necessary for their optimal functioning.²⁰

One must not get the narrow impression that the physical education curriculum is designed to produce just physical fitness. We are also concerned with social and

²⁰Ibid., p. 565.

emotional fitness as well. Physical educators generally agree that physical education activities under the proper leadership contribute heavily to the social and personality adjustment of all participants.

Social adjustment is based upon a feeling of social security and is an outgrowth of an individual's social skills, his knowledge of social standards, and his ability to function as a social being.²¹ The gymnasium and the athletic field are excellent laboratories to mold desirable habits which can be utilized in society.

Whittle discusses the effects of elementary school physical education upon some aspects of physical, motor, and personality development of boys 12 years of age. The conclusions which appear valid as a result of his study are as follows:

In this study, the two groups of 81 boys each, who participated in good and poor elementary school physical education for a period of three years, were found to be essentially alike in the maturity elements of chronological age, skeletal age, weight, height, Wetzel developmental level, and McCloy's classification Index I. However, differences between the two groups were definite for the following effective test batteries and effective test items: leg lift strength, Physical Fitness Index, Metheny-Johnson Test of Motor Educability, Strength Index, back lift strength, Indiana Physical Fitness Test, vertical jump and arm

²¹Lowell G. Biddulph, "Relationship of Athletic Achievement to Personal and Social Adjustment of High School Boys," (microcarded D.Ed. dissertation, University of Utah, 1951).

strength.²²

In view of the basic maturity similarity of the two groups, Whittle concluded that the superior performances in the listed affective test items and batteries of the boys from the good program were attributed to their participation in this type of physical education during their elementary school years.

Many articles have been written concerning the importance of physical fitness in our youth. In terms of muscle and the ability to do jobs requiring physical strength, the average American youth of today appears to be growing soft. In some countries of Europe, where children enjoy fewer of the advantages of modern civilization, the young people are stronger than in our country. Hans Kraus²³ reported that the youth of the United States are far behind other countries in physical fitness.

President Eisenhower was so concerned about the fitness of American youth that he called a Conference on Fitness of Youth on June 18-19, 1956. In the keynote opening address, Vice-President Richard Nixon, serving as chairman, said "...the objective of an adequate physical fitness

²²Douglas H. Whittle, "Effects of Elementary Physical Education Upon Some Aspects of Physical, Motor, and Personality Development of Boys Twelve Years of Age," (microcarded Ph.D. dissertation, University of Oregon, 1956).

²³Editorial, "Results of the Kraus-Weber Tests," Sports Illustrated, XXVI, July, 1955, p. 27.

program can be summed up in one word--participation..."²⁴

Everyone agrees that the person who has physical fitness tends to have a healthy mental outlook and a general feeling of bodily well-being. Physical activity relieves the emotional strain under which we live and relieves the pressure of our highly productive lives.

The need for action as evidenced by the President's conference is shown by such facts as these:

Less than 50 per cent of our boys and girls in high school have physical education.

Ninety-one per cent of the nation's 150,000 elementary schools have no gymnasium.

Only 1,200 of our 17,000 communities in the United States have full-time recreation leadership.

Forty per cent of those persons entering the Armed Forces in World War II were unable to swim as far as 50 feet.

Drownings between the ages of 25-44 are second only to motor vehicles in accidental deaths.

Most drownings occur within 15-20 yards of some point of safety.

Less than five per cent of our youth have had the opportunity to enjoy the experience of camping and outdoor living.

Ninety per cent of the nation's elementary schools have less than the recommended five acres of land necessary for essential play areas.²⁵

Realizing the importance of improved fitness of American youth, the delegates to this convention prepared and

²⁴American Association of Health, Physical Education, and Recreation, "Fitness of American Youth," Journal of Health, Physical Education, and Recreation, XXVII, September, 1956, pp. 8-9.

²⁵Ibid.

approved a statement which included the following points:

Fitness is that state which characterizes the degree to which the person is able to function. Fitness is an individual matter. It implies the ability of each person to live most effectively within his potentialities. Ability to function depends upon the physical, mental, emotional, social and spiritual components of fitness, all of which are related to each other and are mutually interdependent.

This means that each person, in order to satisfy his own needs and, at the same time, contribute his share to the welfare of society must possess:

1. Optimum organic health consistent with heredity and the application of present health knowledge.
2. Sufficient coordination, strength, and vitality to meet emergencies, as well as the requirements of daily living.
3. Emotional stability to meet the stresses and strains of modern life.
4. Social consciousness and adaptability with respect to the requirements of group living.
5. Sufficient knowledge and insight to make suitable decisions and arrive at feasible solutions to problems.
6. Attitudes, values, and skills which stimulate satisfactory participation in a full range of daily activities.
7. Spiritual and moral qualities which contribute the fullest measure of living in a democratic society.

It was concluded that for each individual at each developmental stage, there is a desirable level of total fitness to be sought according to that person's role in life.²⁶

The bulk of the available literature tends to impress upon the reader that a high level of physical fitness is certainly desirable. On a superficial level it is very easy to criticize the profession of physical education and the curriculum of physical education. There is only one way to

²⁶Ibid.

determine our status, that is test the students, and on the basis of the test results, revise the curriculum in an attempt to improve the status of the students.

CHAPTER III

COLLECTION OF DATA

The Test

All male freshmen who were enrolled in the required physical education program in the school year of 1956-57 were the subjects for this study. The Rogers' physical fitness test, which consists of four strength tests, lung capacity, two endurance tests, and height and weight, was administered as described by Clarke²⁷ and Reynolds.²⁸ This test was given in November, 1956, and again in May, 1957.

Rogers' strength index (S.I.) and physical fitness index (P.F.I.) were obtained by administering the seven above mentioned test items. The strength index is the sum of the subject's score on these tests. By dividing the achieved strength index by the normal strength index for the age and weight of the subject, the physical fitness index is obtained. The formula used is:

$$\frac{\text{Achieved Strength Index} \times 100}{\text{Normal Strength Index}}$$

²⁷H. Harrison Clarke, Application of Measurement to Health and Physical Education, (2nd edition; New York: Prentice-Hall, Inc., 1950), pp. 149-179.

²⁸Charles Reynolds, "Comparative Effects of Two Physical Education Programs on the Physical Fitness and Motor Educability of Ninth and Tenth Grade Boys," (unpublished M.S. thesis, South Dakota State College, 1957).

The Testers

The testers were all graduate students who were majoring in physical education. All testers were qualified by Dr. Campbell Snowberger, advisor for the graduate students at South Dakota State College. Each tester became thoroughly familiar with testing procedures during a training session prior to the gathering of the data.

CHAPTER IV

TREATMENT OF THE DATA

A statistical analysis of the results of this study is presented in this chapter. A graphic presentation of the results will be found in the appendix. Table I shows the data for the various groups.

TABLE I

Statistical Treatment of Various Groups

GROUP	M1	M2	M(d)	t RATIO	t's AT DESIRED LEVEL OF CONFIDENCE	
					.01	.05
All Students	90.6	92.55	1.95	2.58	2.58	1.96
Agriculture	92	95	3.00	2.19	2.66	2.00
General Registration	91.5	95.15	3.65	2.06	2.70	2.02
Engineering	90.3	91.63	1.33	1.17	2.62	1.98
Pharmacy	89.6	92.17	2.57	1.00	2.83	2.08
Science and Applied Arts	90.2	95.44	5.24	2.03	2.70	2.02
Age 18	91.7	92.4	.70	.625	2.58	1.96
Age 19	89.4	93.68	4.28	3.85	2.63	1.99
Age 20	91	93.17	2.17	1.21	2.68	2.01
Rural	92.4	94.2	1.82	1.80	2.58	1.96
Urban	89.4	92.9	3.5	3.68	2.58	1.96
No Physical Education	84	85.56	1.56	1.66	2.60	1.97
Physical Education	95	99.27	4.27	4.19	2.58	1.96

The mean improvement in the physical fitness index for the entire freshman class was 1.95 which was significant at the .01 level of confidence. The critical ratio for this group was 2.58. A critical ratio of 2.58 was necessary to

establish significance at the .01 level of confidence.

Figure 1 in the appendix shows the variability of the scores of this group of students. An increase in the median from 90.7 to 91.9 is a further indication of the improvement for this group. In the initial testing the scores ranged from a low of 52 to a high of 138, and in the final testing the scores ranged from a low of 51 to a high of 139.

Agriculture Students (figure 2, appendix)

The mean gain for the agriculture students was 3.00 points which was significant just beyond the .05 level of confidence. The critical ratio for this group was 2.19 as compared to a critical ratio of 2.00 which was necessary to establish significance at the .05 level of confidence. It was noted that although the mean improvement for this group was significant, the median remained relatively constant. The initial median was 92.8 as compared to a final median of 92.3. In the initial testing the scores ranged from a low of 51 to a high of 127, and in the final testing the scores ranged from a low of 62 to a high of 136.

General Registration Students (figure 3, appendix)

The mean gain for this group was 3.65 which was significant just beyond the .05 level of confidence. The critical ratio for this group was 2.06 as compared to a critical ratio of 2.02 which was necessary to establish significance at the .05 level of confidence. The median for this group varied from an initial value of 90.7 to 89.3 on the final

test. The range of scores on the initial test was from a low of 51 to a high of 138 in comparison to a low of 60 and a high of 139 on the final test.

Engineering Students (figure 4, appendix)

The mean gain for the engineering students was 1.33 points which did not reach significance at the .05 level of confidence. The critical ratio for this group was 1.17 as compared to a critical ratio of 1.98 which was necessary to reach significance at the .05 level of confidence. The initial median was 92.4 in comparison to a final median of 91.1. The range of scores on the initial test for this group was from 51 to a high of 138 while it was from 56 to a high of 122 on the final test.

Pharmacy (figure 5, appendix)

The mean improvement for the pharmacy students was 2.57 points which did not reach significance at the .05 level of confidence. The critical ratio for this group was 1.00 as compared to a critical ratio of 2.08 which was necessary to reach significance at the .05 level of confidence. The initial median was 90.5, and the final median was 94.7. The range of scores for this group was from a low score of 55 to a high score of 127 on the initial test and from a low score of 58 to a high score of 121 on the final test.

Science and Applied Arts (figure 6, appendix)

The mean improvement for the science and applied arts students was 5.24 points which was statistically significant

just beyond the .05 level of confidence. The critical ratio was 2.03 as compared to a critical ratio of 2.02 necessary to establish significance at the .05 level of confidence. The initial median was 90.6 as compared to a final median of 87.6. The scores for this group ranged from a low of 57 to a high of 122 on the initial test as compared to a low of 52 and a high of 137 on the final test.

Age 18 (figure 7, appendix)

The mean gain for the group of 18-year-old students was .70 which was not statistically significant at the .05 level of confidence. The critical ratio for this group was .625 as compared to a critical ratio of 1.96 which was necessary to reach significance at the .05 level of confidence. The initial median was 92, and the final median was 92.4. The range of scores was from a low score of 54 to a high score of 138 on the initial test and from a low score of 55 to a high score of 138 on the final test.

Age 19 (figure 8, appendix)

The mean gain for the 19-year-old group was 4.28 which was highly significant beyond the .01 level of confidence. The critical ratio was 3.86 as compared to a critical ratio of 2.63 which was necessary to reach significance at the .01 level of confidence. The initial median was 90.6, and the final median was 90.5. The range of scores for this group was from a low score of 53 to a high score of 129 on the initial test and from a low score of 51 to a high score

of 139 on the final test.

Age 20 (figure 9, appendix)

The mean gain for the 20-year-old group was 2.17 which approached but did not reach significance at the .05 level of confidence. The critical ratio was 1.21 as compared to a critical ratio of 2.01 which was necessary to reach significance at the .05 level of confidence. The initial median was 91.6, and the final median was 93.4. The range of scores on the initial test was from a low of 51 to a high of 133 as compared to a low of 53 and a high of 133 on the final test.

Rural Students (figure 10, appendix)

The mean gain for the rural students was 1.82 which was not significant at the .05 level of confidence. The critical ratio for this group was 1.80 in comparison to a critical ratio of 1.96 which was necessary for significance at the .05 level of confidence. The initial median was 91.8, and the final median was 94. The range of scores was from a low of 52 to a high of 138 on both tests.

Urban Students (figure 11, appendix)

The mean gain for the urban students was 3.5 which was highly significant beyond the .01 level of confidence. The critical ratio was 3.68 as compared to a critical ratio of 2.58 which was necessary to attain significance at the .01 level of confidence. The initial median was 90.4, and the final median was 90.2. The scores ranged from a low of

51 to a high of 138 on the initial test and from a low of 51 to a high of 139 on the final test.

Students Without a Physical Education Curriculum in High School (figure 12, appendix)

The mean gain for this group of students was 1.56 which approached but did not reach significance at the .05 level of confidence. The critical ratio for this group was 1.66 as compared to a critical ratio of 1.97 which was necessary to reach significance at the .05 level of confidence. The initial median was 85.9, and the final median was 86. The range of scores was from a low of 51 to a high of 121 on the initial test and from a low of 52 to a high of 123 on the final test.

Students With a Physical Education Curriculum in High School (figure 13, appendix)

The mean gain for this group of students was 4.27 which was highly significant beyond the .01 level of confidence. The critical ratio was 4.19 as compared to a critical ratio of 2.58 which was necessary to establish significance at the .01 level of confidence. The initial median was 97.5 as compared to a final median of 96.3. The range of scores was from a low of 52 to a high of 138 on the initial test and from a low of 57 to a high of 139 on the final test.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The general purpose of this study was to determine the effect of three academic quarters of physical education upon the physical fitness, as measured by the Rogers' physical fitness index, of all freshman male students enrolled in the physical education service courses at South Dakota State College. The sample consisted of 313 men students.

The entire sample was analyzed for purposes of comparison according to chronological age, divisions in which the students were registered in the college, residence (rural or urban), and physical education background in high school.

Conclusions

The results of the initial administration of the Rogers' physical fitness test revealed the following means for the various groups: students with a physical education curriculum in high school--95; rural students--92.4; Agricultural students--92; students age 18--91.7; General Registration students--91.5; students age 20--91; all students--90.6; Engineering students--90.3; Science and Applied Arts students--90.2; Pharmacy students--89.6; students age 19--89.4; urban students--89.4; and students without a physical education curriculum in high school--84.

The results of the final testing revealed the following

means for the various groups: students with a physical education curriculum in high school--99.27; Science and Applied Arts students--95.44; General Registration students--95.15; Agricultural students--95; rural students--94.2; students age 19--93.68; students age 20--93.17; urban students--92.9; all students--92.55; students age 18--92.4; Pharmacy students--92.17; Engineering students--91.63; and students without a physical education curriculum in high school--85.56.

The students enrolled in Science and Applied Arts Division showed the highest mean gain, 5.24. The other divisions were ranked in the following order in respect to mean gain: General Registration--3.65; Agriculture--3.00; Pharmacy--2.57; and Engineering--1.33.

The 19-year-old group showed a mean gain of 4.23, whereas the 20-year-old group showed a mean improvement of 2.17. The 18-year-old group showed a mean improvement of .70. The urban students showed a mean gain of 3.5, and the rural students showed a mean improvement of 1.82.

A further breakdown of students as to background in physical education in high school disclosed that the mean improvement for those who had taken physical education in high school was 4.27 in comparison to a mean improvement of 1.56 for those who had not taken physical education in high school.

It is important to note at this point that the group which had physical education in high school not only showed

a significant change from the pre-test but also had a higher initial physical fitness index than all other groups. This would lead one to believe that physical education has a positive influence upon the physical fitness of all participants.

A comparison of means for all students indicates that there was a mean improvement of 1.95 points between the initial and final tests.

Recommendations

The mean improvement after a year of physical education as required at South Dakota State College is minimal. It is quite evident that the program is not nearly strenuous enough. To improve this program, the following suggestions are offered:

1. A physical education staff member should be made fully responsible for the required physical education program. His title could be "Chairman of the Required Physical Education Program." He would provide in-service training for the instructors, who are usually graduate assistants, and assist these instructors to offer the best program possible.

2. Through the cooperative action of all staff members, objectives of the program should be enumerated.

3. A syllabus for all classes should be developed so that the classes have some direction. Each individual should be taught in the physical education class as the exceptional

student is taught on the athletic field.

4. A program for testing the physical status of the students should be continued. The sub-par students should be given a developmental program designed to help them approach the desired level of physical fitness.

5. A follow-up program of research should be initiated to determine the manner of maintenance of the acquired level of physical fitness.

6. Further changes in the program would be based on the successful inauguration of the above recommendations. The author feels that implementation of these recommendations would lead to an improved program and an improved level of physical fitness of our students.

LITERATURE CITED

Books

- Clarke, H. Harrison, The Application of Measurement to Health and Physical Education, New York: Prentice-Hall, Inc., 1950.
- Larson, Leonard A., and Yocom, Rachel D., Measurement and Evaluation in Physical, Health, and Recreation Education, St. Louis: C.V. Mosby Co., 1951.
- Lee, Mabel, and Wagner, Miriam M., Fundamentals of Body Mechanics and Conditioning, Philadelphia and London: W.B. Saunders Co., 1949.
- Riedman, Sarah R., Physiology of Work and Play, New York: The Dryden Press, 1953.
- Schneider, Edward C., and Karpovich, Peter V., Physiology of Muscular Activity, Philadelphia and London: W.B. Saunders Co., 1948.
- Smiley, Dean F., and Gould, Gordon A., Your Health, New York: Macmillan Co., 1951.
- Williams, Jesse F., Healthful Living, New York: Macmillan Co., 1938.

Periodicals

- American Association of Health, Physical Education, and Recreation, "Fitness of American Youth," Journal of Health, Physical Education, and Recreation, XXVII (September, 1956), pp. 8-9.
- Anderson, W.G., "Further Studies in Longevity of Yale Athletes," Mind and Body, XI (December, 1916), p. 374.
- McCloy, C.H., "How About Some Muscle," Journal of Health and Physical Education, VII (May, 1936), pp. 302-303.
- McCloy, C.H., "What is Physical Fitness," Journal of Health, Physical Education, and Recreation, XXVII (September, 1956), pp. 14-15.

Metheny, Eleanor, "Are Sports Enough," Journal of Health and Physical Education, XXIII (May, 1943), p. 26.

Rogers, F.R., "The Significance of Strength Tests in Revealing Physical Condition," Research Quarterly, V (October, 1934), pp. 43-46.

Editorial, "Results of the Kraus-Weber Tests," Sports Illustrated, XXI (July, 1955), pp. 27-28.

Steinhaus, A.H., "Why Exercise," Journal of Health and Physical Education, V (May, 1934), pp. 5-7.

Unpublished Materials

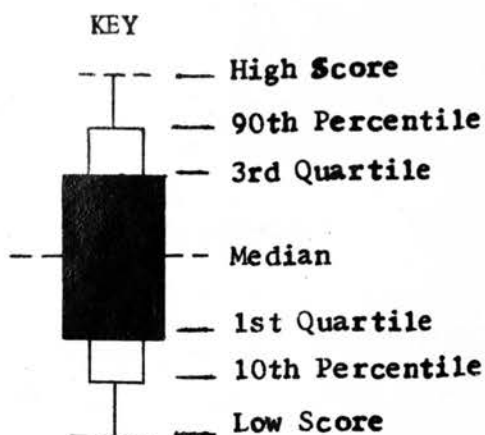
Biddulph, Lowell G., "Relationship of Athletic Achievement to Personal and Social Adjustment of High School Boys," Microcarded D.Ed. dissertation, University of Utah, 1951.

McCollum, Robert, and Coefield, John, "A Case Study Report of 78 University Freshmen with Low Physical Fitness Indices," Microcarded M.S. thesis, University of Oregon, 1955.

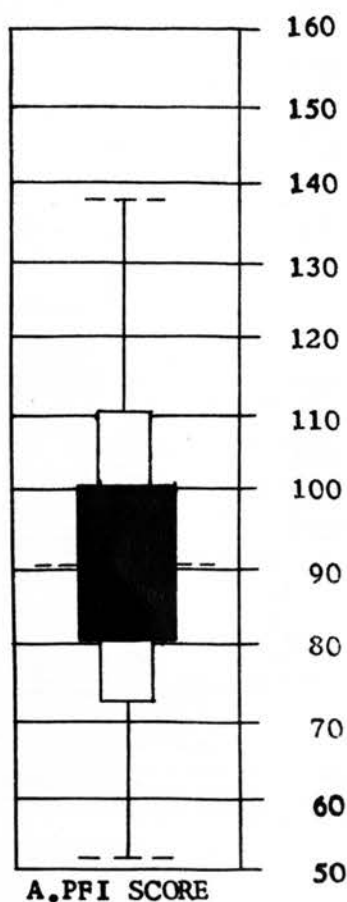
Reynolds, Charles, "Comparative Effects of Two Physical Education Programs on the Physical Fitness and Motor Educability of Ninth and Tenth Grade Boys," Unpublished M.S. thesis, South Dakota State College, 1957.

Whittle, Douglas H., "Effects of Elementary Physical Education Upon Some Aspects of Physical, Motor, and Personality Development of Boys Twelve Years of Age," Microcarded Ph.D. dissertation, University of Oregon, 1956.

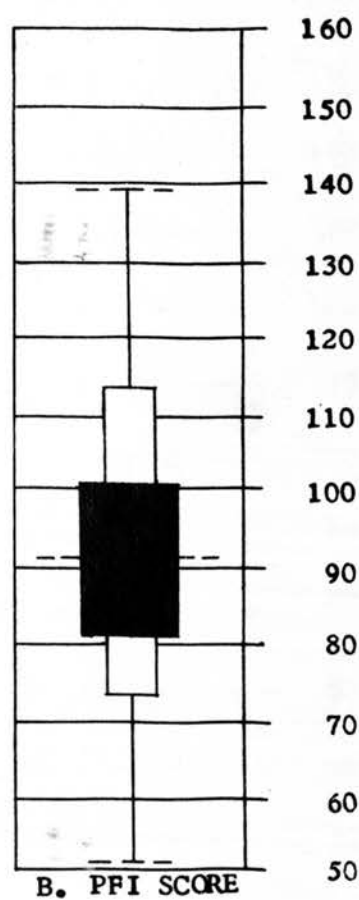
APPENDICES



Initial Test

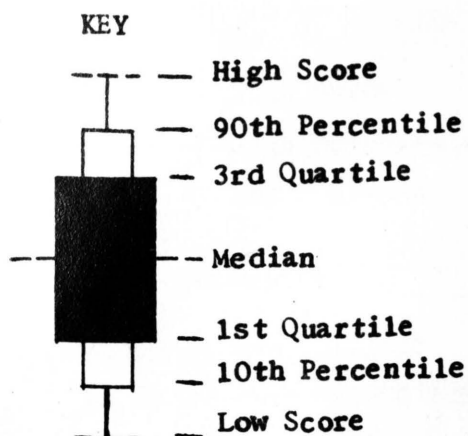


Final Test

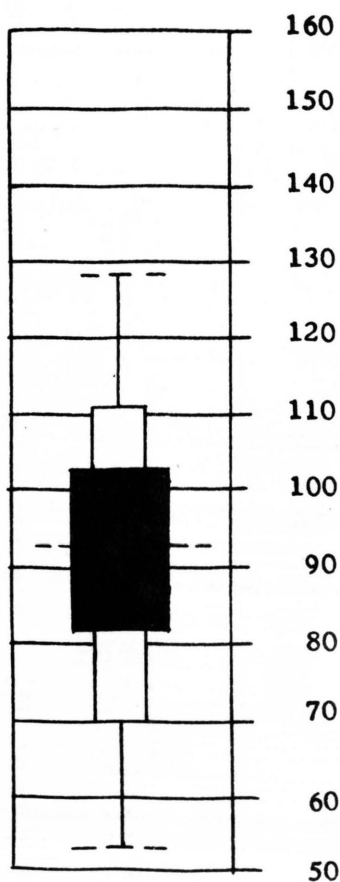


PHYSICAL FITNESS INDICES OF ALL STUDENTS

Figure 1.

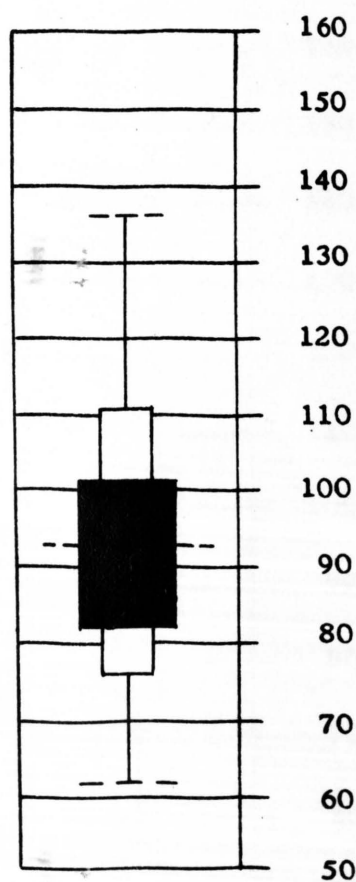


Initial Test



A. PFI SCORE

Final Test



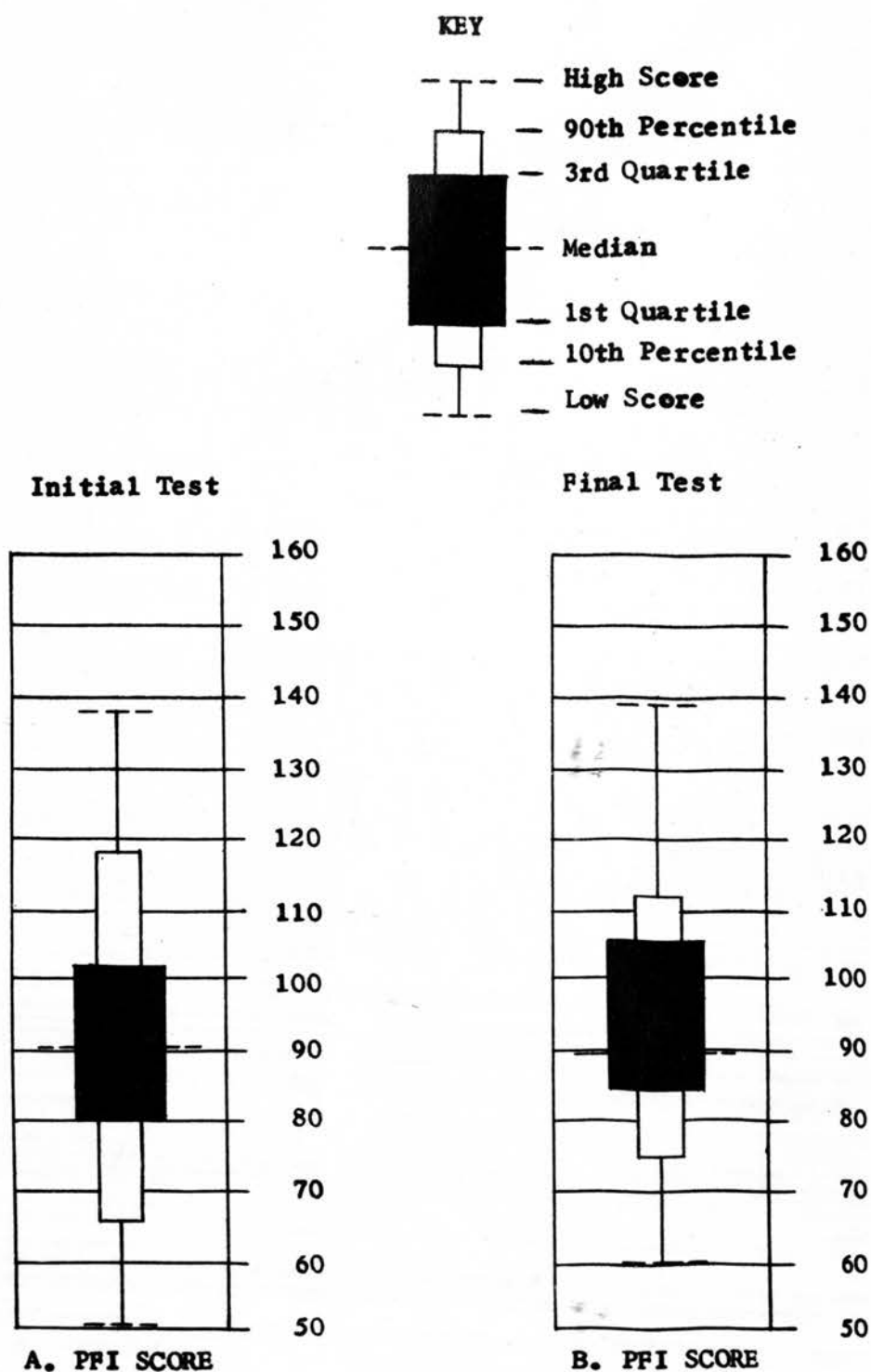
B. PFI SCORE

PHYSICAL FITNESS INDICES OF STUDENTS

ENROLLED IN THE DIVISION OF

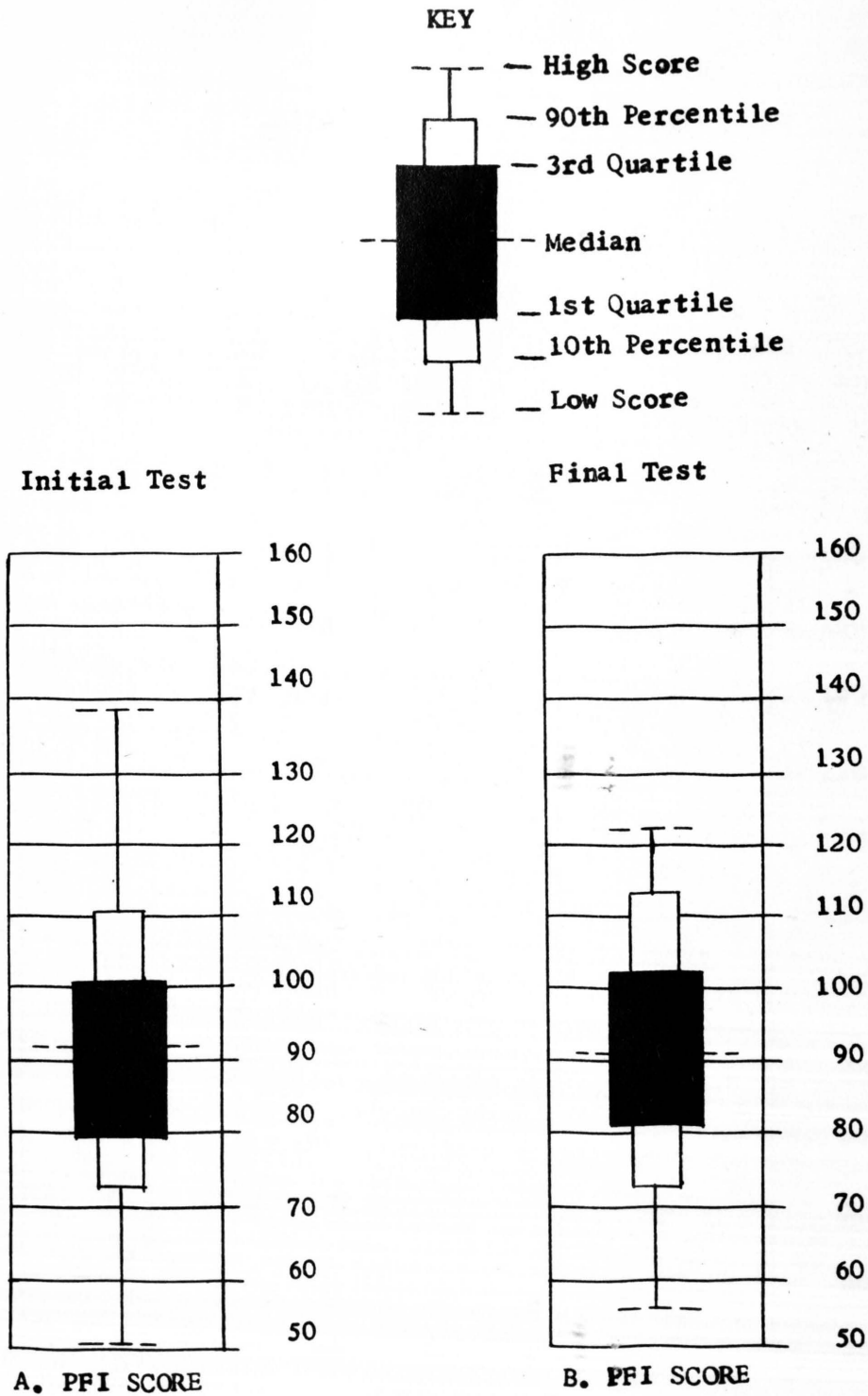
AGRICULTURE

Figure 2.



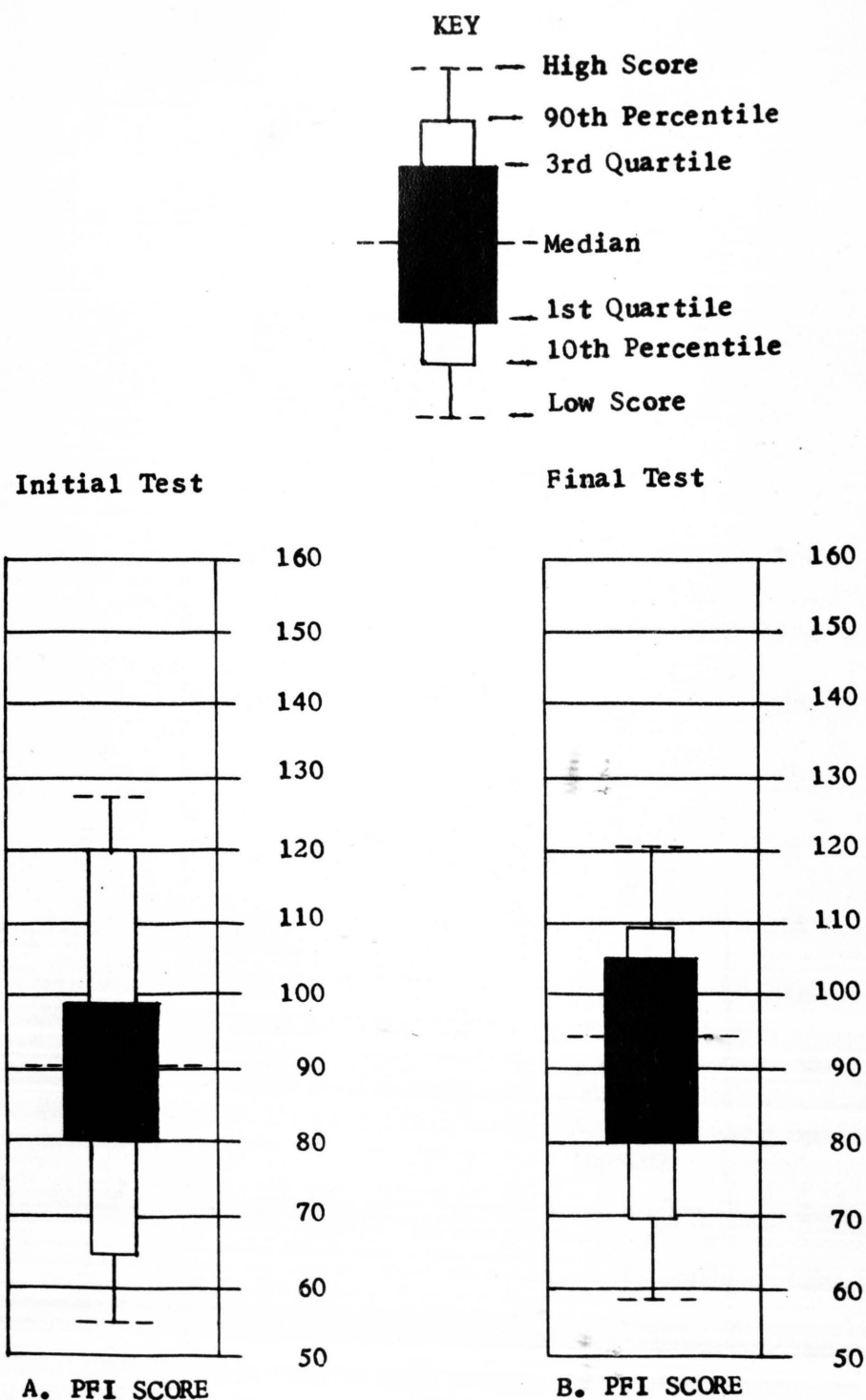
PHYSICAL FITNESS INDICES OF
GENERAL REGISTRATION STUDENTS

Figure 3.



PHYSICAL FITNESS INDICES OF STUDENTS
ENROLLED IN THE DIVISION OF
ENGINEERING

Figure 4.

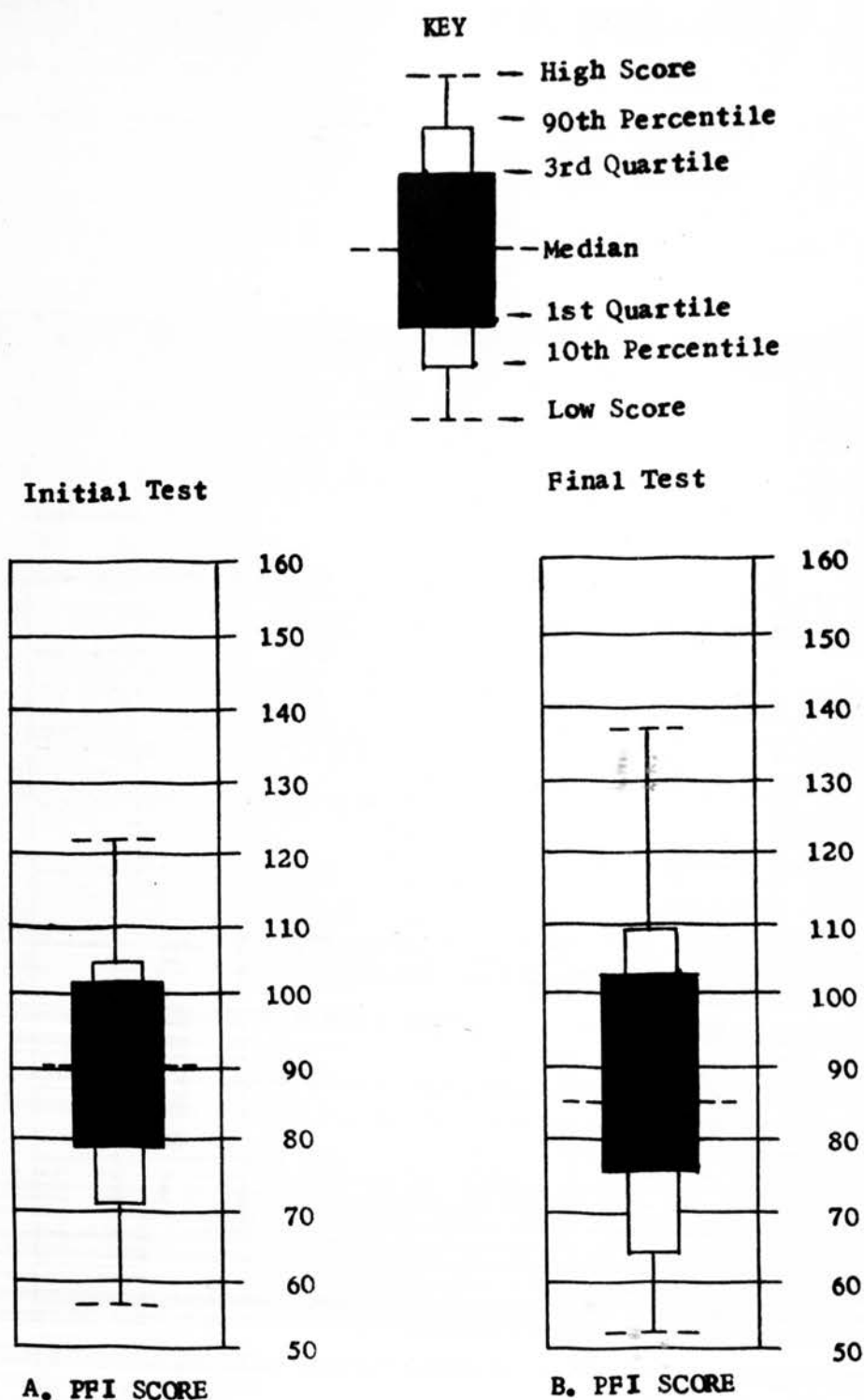


PHYSICAL FITNESS INDICES OF STUDENTS

ENROLLED IN THE DIVISION OF

PHARMACY

Figure 5.

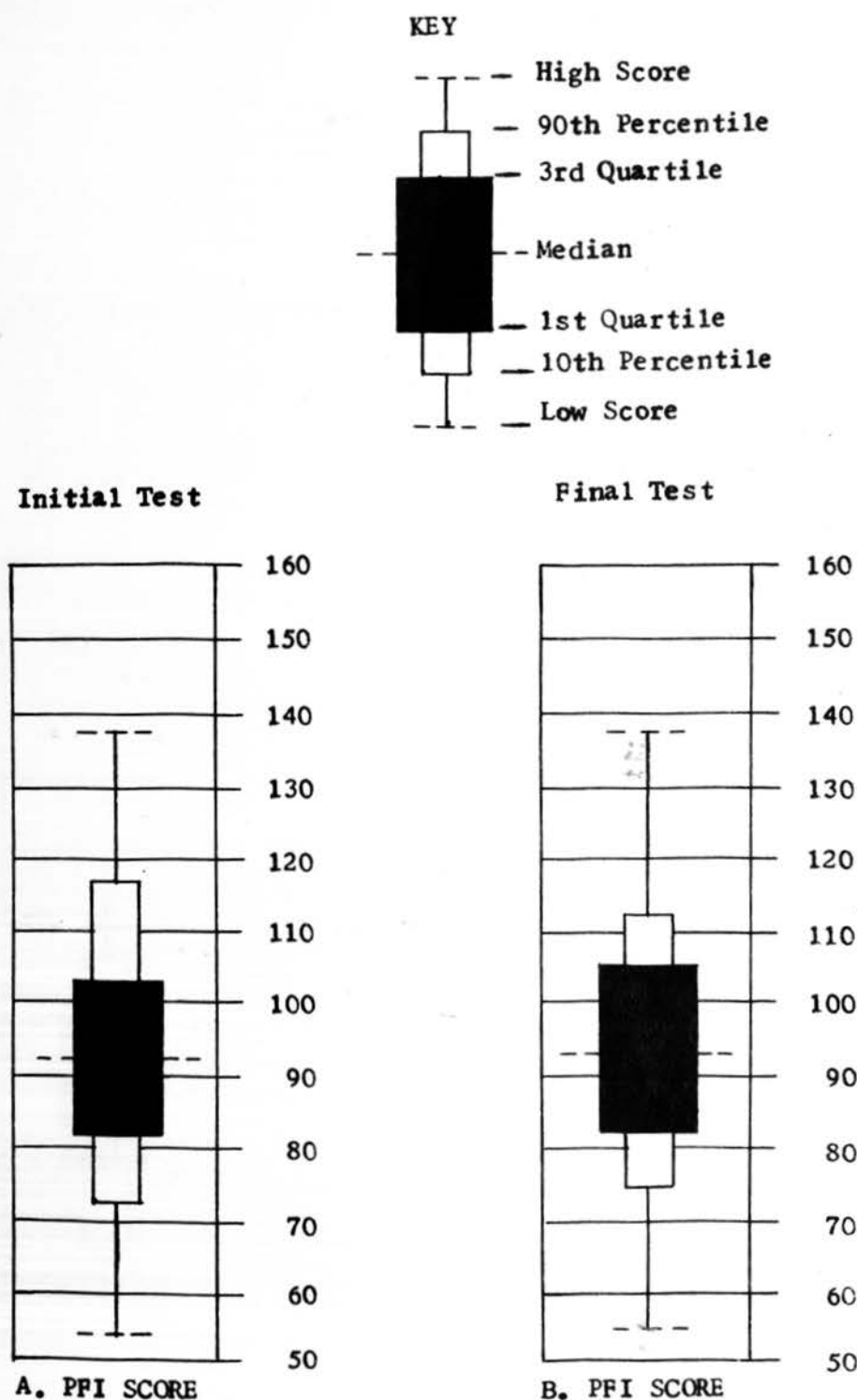


PHYSICAL FITNESS INDICES OF STUDENTS

ENROLLED IN THE DIVISION OF

SCIENCE AND APPLIED ARTS

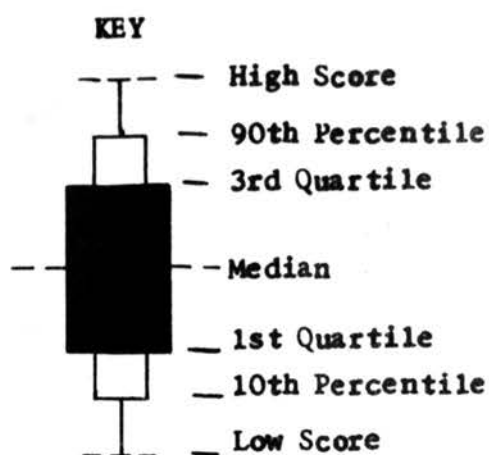
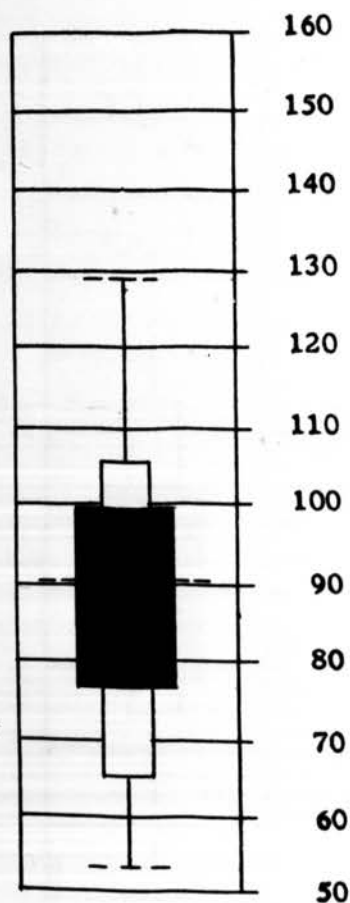
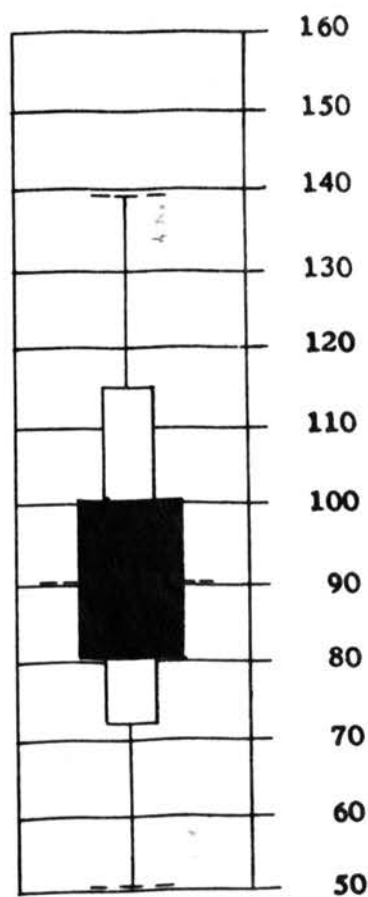
Figure 6.

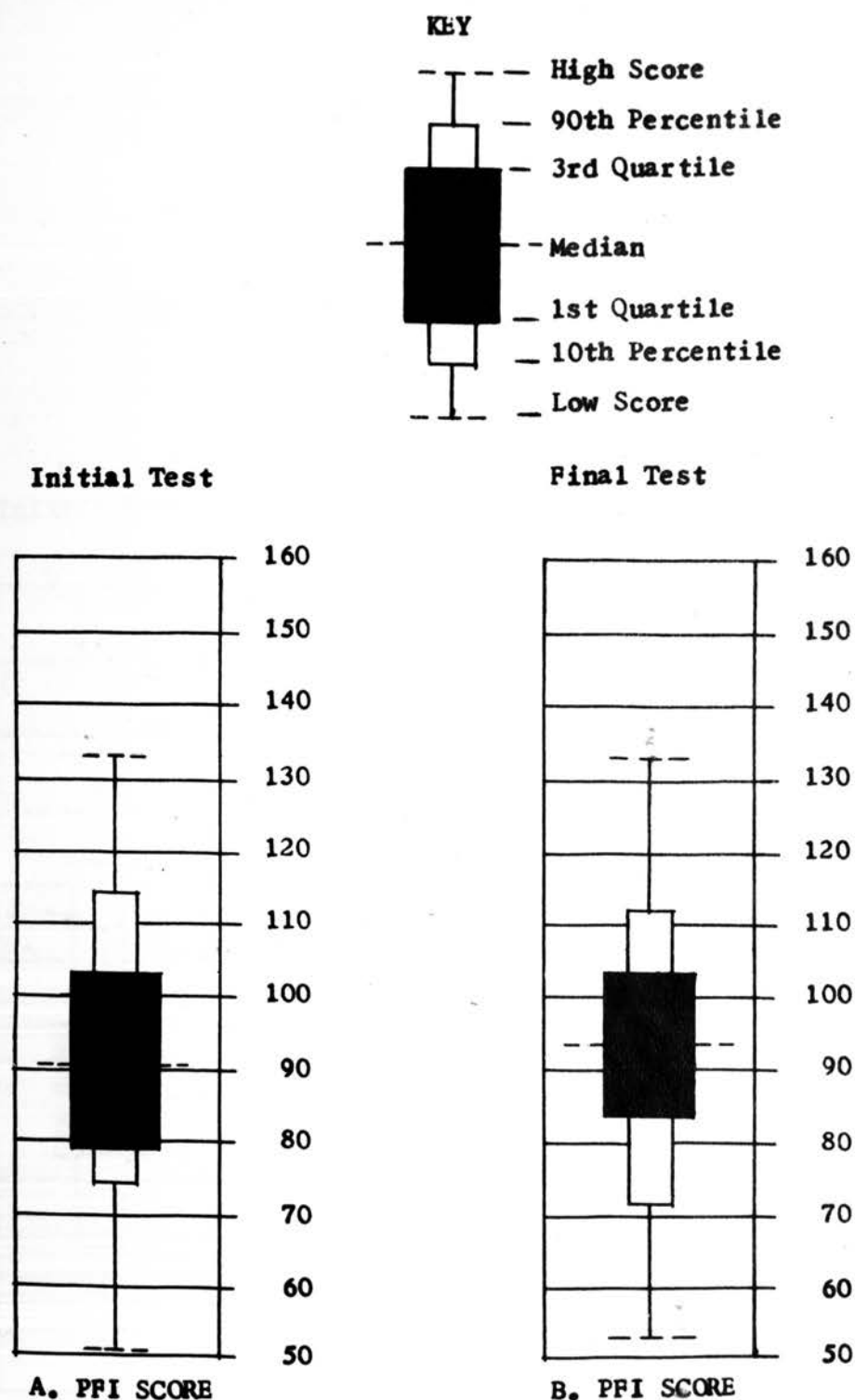


PHYSICAL FITNESS INDICES OF STUDENTS

AGE 18 AND UNDER

Figure 7.

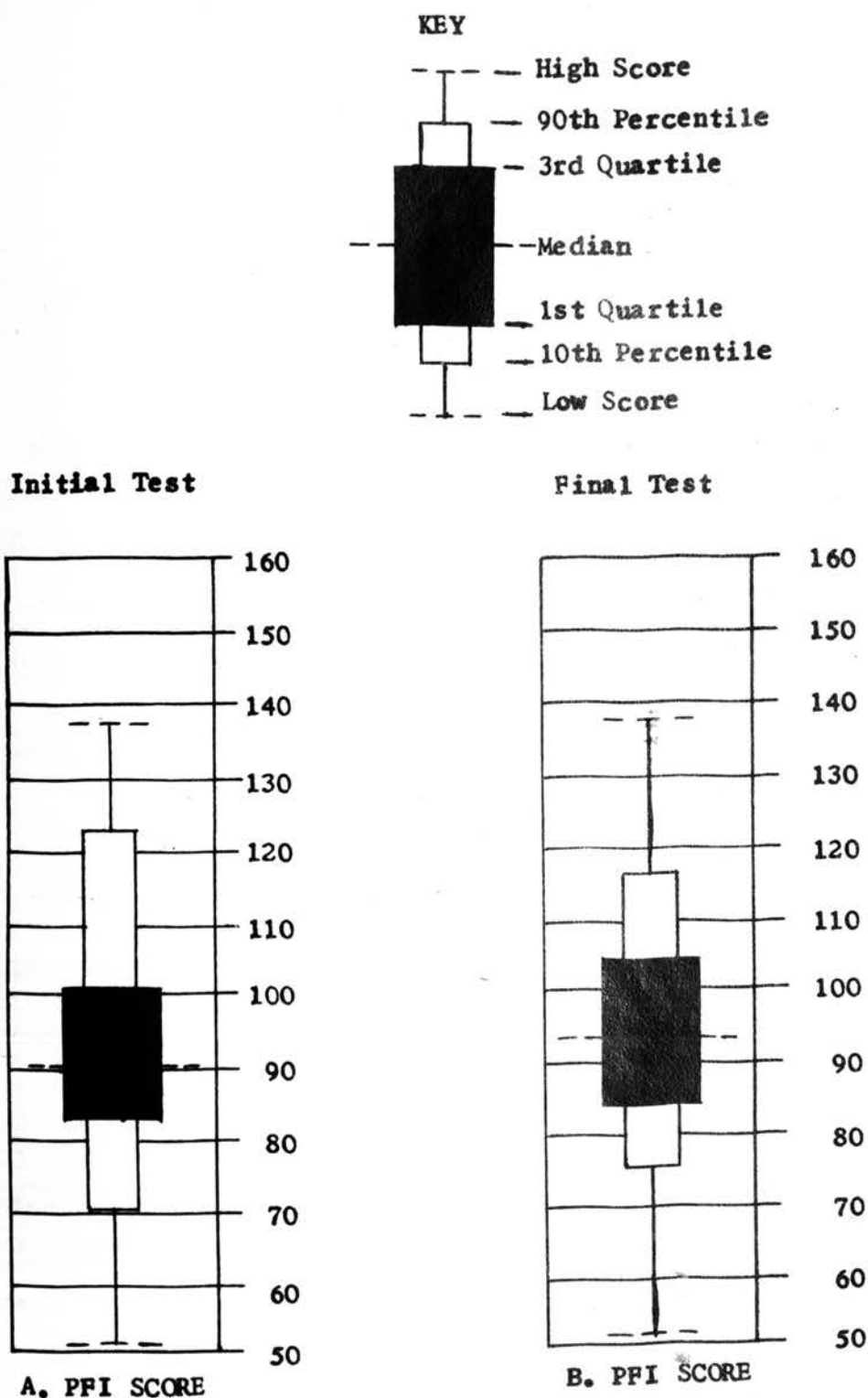
**Initial Test****A. PFI SCORE****Final Test****B. PFI SCORE****PHYSICAL FITNESS INDICES OF STUDENTS****AGE 19****Figure 8.**



PHYSICAL FITNESS INDICES OF STUDENTS

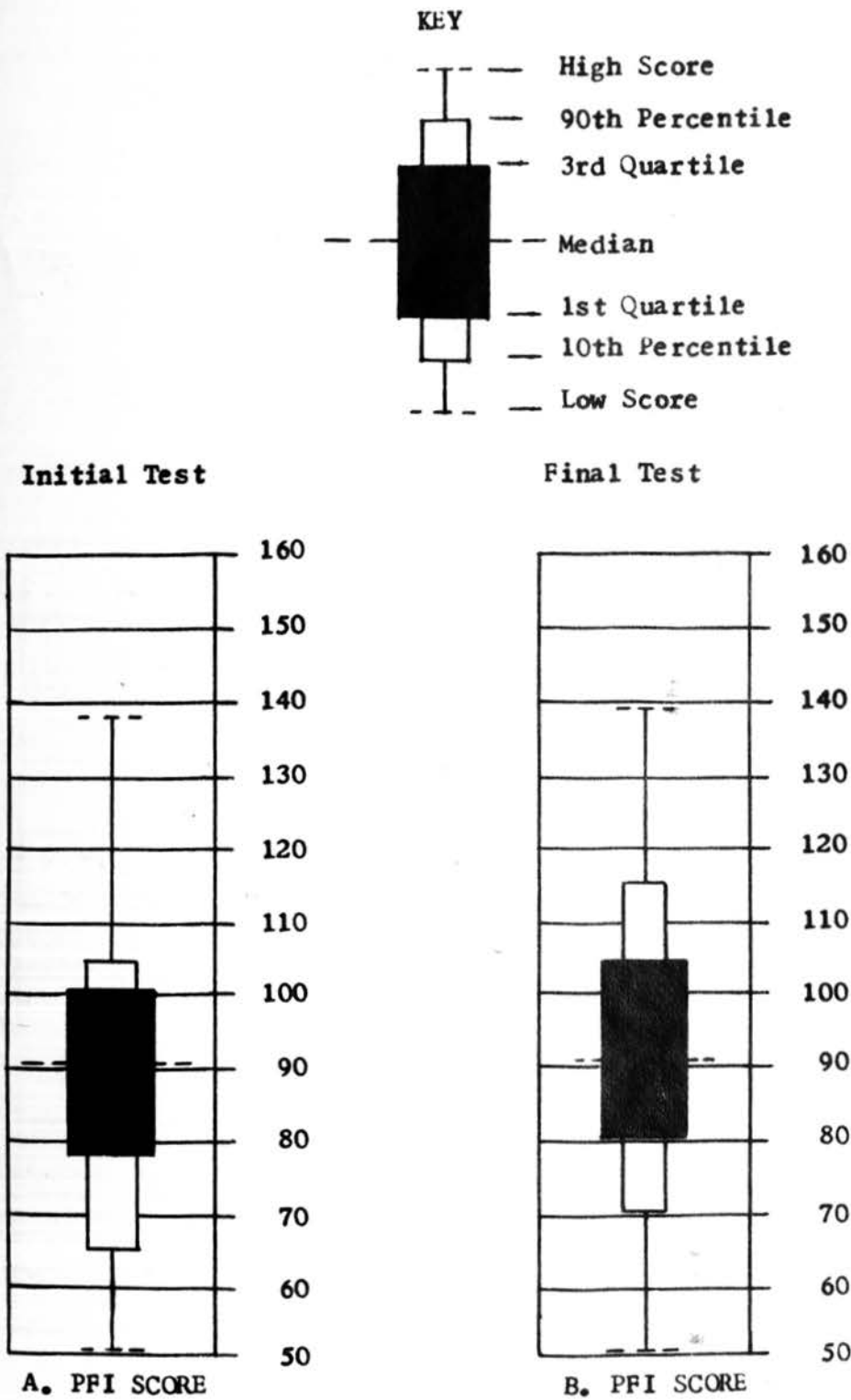
AGE 20 AND OVER

Figure 9.



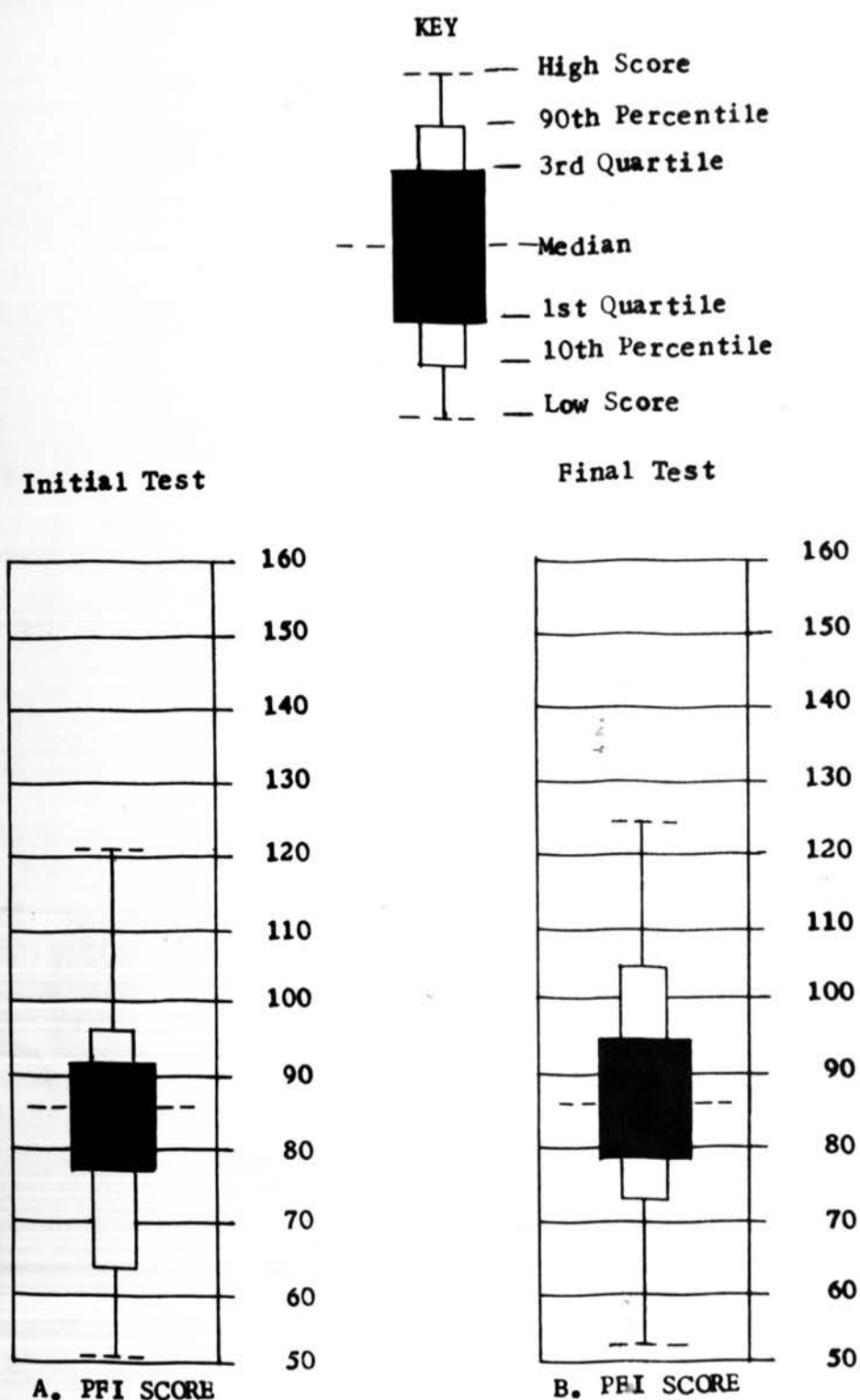
PHYSICAL FITNESS INDICES OF ALL RURAL STUDENTS

Figure 10.



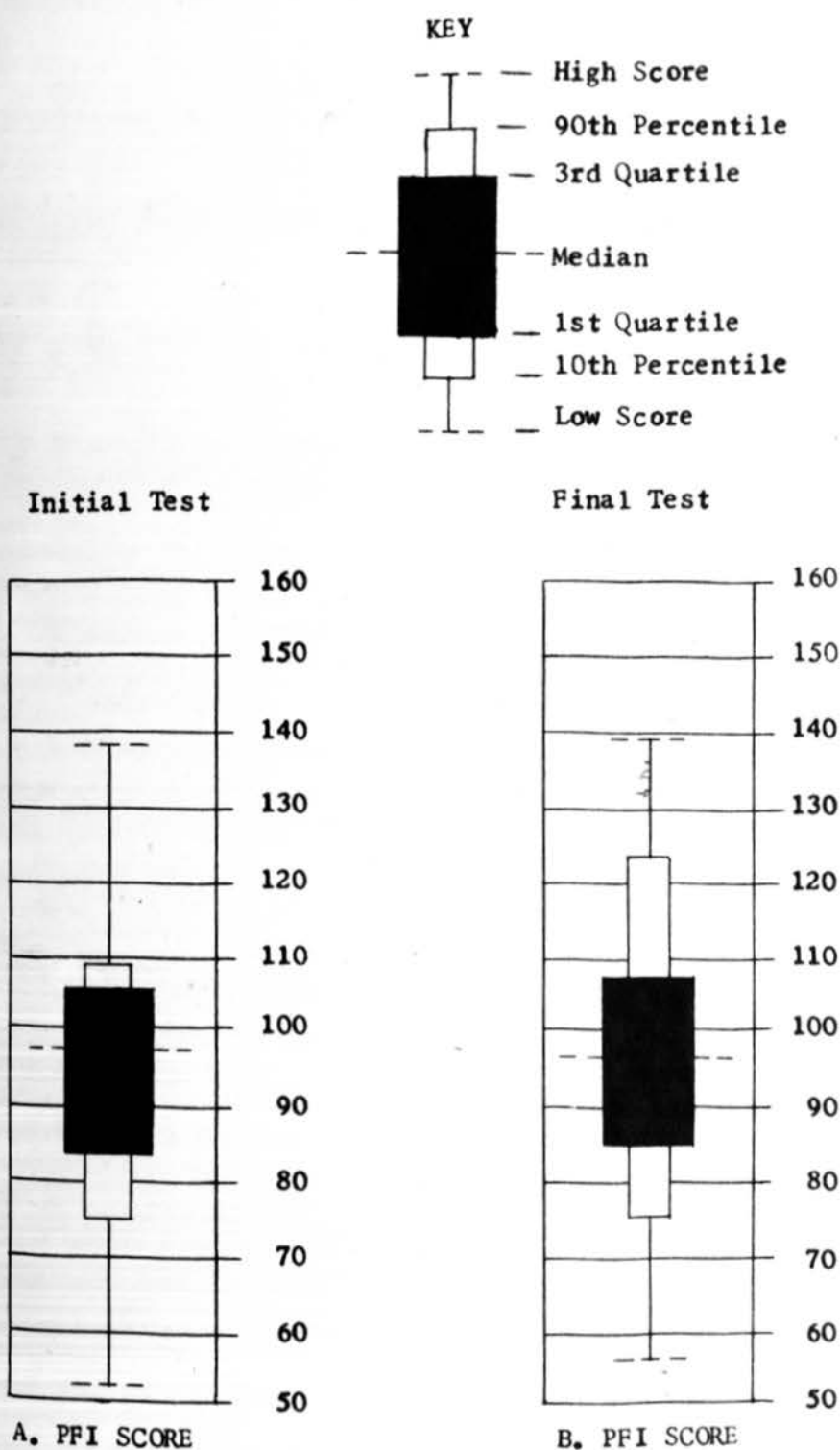
PHYSICAL FITNESS INDICES OF ALL
URBAN STUDENTS

Figure 11.



PHYSICAL FITNESS INDICES OF STUDENTS WITHOUT
A PHYSICAL EDUCATION CURRICULUM
IN HIGH SCHOOL

Figure 12.



PHYSICAL FITNESS INDICES OF STUDENTS WITH
A PHYSICAL EDUCATION CURRICULUM
IN HIGH SCHOOL

Figure 13.

QUESTIONNAIRE ON
HIGH SCHOOL PHYSICAL EDUCATION

1. Did you take physical education in high school?
225 Yes
193 No
2. If yes, for how many years? 2 (average) How many times per week? 2 (average)
3. If you did not take physical education in high school, please check why.
178 Not required
4 Not required in 11th and 12th grades
 Excused to play in band
10 Excused because you were on a varsity squad
1 Excused because of military training
 Excused for medical reasons
 Excused for other reason. Please indicate reason_____

4. Did your teacher change into appropriate uniform to teach his physical education classes? (Please check)
14 Always
10 Usually
27 Rarely
174 Never
5. Did your teacher actually teach his students? (Please check)
20 Always tried to teach
19 Almost always tried to teach
118 Occasionally tried to teach
68 Never tried to teach
6. Did your teacher toss out a ball to his class and permit them to play? (Please check)
144 Always
46 Usually
17 Occasionally
18 Never
7. Did your teacher try to give individual help to students who needed it?
111 Yes
114 No

8. Please indicate below how you spent the time in your physical education classes.
- 70 We played most of the time.
- 27 Most of the time was spent in instruction and practice of techniques.
- 128 Time was fairly well divided between playing and practice.
9. Did your physical education teacher absent himself from the area while classes were in session?
- 3 Always
- 44 Frequently
- 126 Rarely
- 58 Never
10. Did your physical education teacher occupy himself in something else beside teaching while his class was in session?
- 4 Always
- 72 Frequently
- 119 Rarely
- 30 Never
11. Were all of the students profitably occupied during physical education classes?
- 104 All were occupied
- 121 Most were occupied
- Part were occupied
- When all were not occupied, please indicate what others were doing _____
12. In general, please indicate your rating of your physical education teacher.
- 11 Compared with the best academic teachers
- 126 Compared with average academic teachers
- 20 Compared to poorest academic teachers
- 8 Poorer than poorest academic teachers
13. Was your physical education teacher interested in (Please check)
- 22 All students
- 41 Only superior students
- 162 Only varsity athletes
14. Was your physical education teacher constantly interested in helping all students?
- 44 Yes
- 181 No

15. Did your physical education teacher vary the type of program you had from year to year?

76 Yes

149 No

16. Was your physical education program progressive in the sense that your English and math were (that is, the program of the 11th grade was built on what you had in the 10th grade, etc.)?

79 Yes

148 No

17. What activities did you have in your high school physical education program?

Basketball--211

Football--153

Volleyball--143

Softball--36

Track--46

Gymnastics--45

Soccer--32

Boxing--20

18. Please indicate your over-all evaluation of your high school physical education program.

10 Excellent

175 Fair

40 Poor

Typed by
Gail Prins